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ABSTRACT

A 2x2x2 factorial design was utilized to investigate the effects of race of expressor (black and white), race of perceiver, and sex of perceiver on perception of emotion (POE) in children. Perception of four emotions (anger, happiness, surprise, and pain) was analyzed in terms of three scores as DV's: (1) overall accuracy scores, (2) correct perception of individual emotions scores, and (3) erroneous perception of individual emotions scores. Results indicated insignificant main and interaction effects for all of the DV's. Theoretical implications of the impact of cultural forces of POE were discussed. (Author)

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RACE AND SEX DIFFERENCES AMONG CHILDREN IN PERCEPTION OF EMOTION

A. George Gitter and Arthur J. Quincy, Jr.

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ABSTRACT

A 2x2x2 factorial design was utilized to investigate the effects of race of expressor (black and white), race of perceiver, and sex of perceiver on perception of emotion (POE) in children. Perception of four emotions (anger, happiness, surprise, and pain) was analyzed in terms of three scores as DV's: (1) overall accuracy scores, (2) correct perception of individual emotions scores, and (3) erroneous perception of individual emotions scores. Results indicated insignificant main and interaction effects for all of the DV's. Theoretical implications of the impact of cultural forces on POE were discussed.

PROBLEM

Perception of emotion (POE) in the adult human has been the subject of extensive research in psychology. However, there are relatively few studies of POE in children. Furthermore, due to a lack of experimental and statistical sophistication, the results of many of the POE studies are subject to question. Since the study of POE in children is critical toward understanding the impact of cultural forces on the development of POE, the present study attempted to examine the effects of some of the variables found to be significant in adult studies. More specifically, this study attempted to add to the clarity of the previously investigated variables of race and sex of expressor, as well as to test the effect of the race and sex of children as perceivers.

Charles Darwin's (1872) pioneering effort in POE is considered to be a classic prototype of much of the later research in this area. The results of his research demonstrated that nonverbal communication (NVC), such as facial expressions, are at least as important as verbal content in the perception and recognition of emotional expression. Facial expressions and body movements have been the subject of research in psychology since the 1920's. Early research in NVC was concerned with the consistency between nonverbal and other aspects of expressive behavior. Recent research in NVC has been incorporated in studies of empathy,

clinical judgment, psychotherapeutic situations, and communication theory (Ekman and Friesen, 1967). A major contention in theory and research has been that NVC and POE are intimately related.

Although POE research has continued since the time of Darwin it has been limited in scope and has failed to consider many relevant variables. Much of the early research, although recognizing race and sex differences in POE, has failed to consider both race and sex of perceiver as well as expressor.

In addition, only a few studies have investigated perception of emotion (POE) among children, and in these, race of perceiver has been only indirectly tested, while race of expressor has been completely ignored. With this in mind, the present study attempted to examine the influence of race and sex of perceiver, as well as, race of expressor on POE among children.

Perception of Emotion: Differences in Mode of Presentation

A review of the literature reveals that recognition of emotion studies employed a variety of stimuli. Research in the identification of a person's emotion employed as stimulus materials real people (Sherman, 1927; Meltzer and Thompson, 1964), still photographs of people (Darwin, 1872; Ruckmick, 1921; Schlosberg, 1952; Ekman, 1965; Gitter and Black, 1968a, 1968b; Kozel and Gitter, 1968), and drawings of people (Boring and Tichener, 1923). The specific emotions were expressed in a natural state in some studies (Munn, 1940; Vinacke, 1949), while in others

they were artificially created in a laboratory situation (Sherman, 1927; Meltzer and Thompson, 1964; Gitter and Black, 1968a, 1968b; Kozel and Gitter. 1968). Some researchers used recordings of a person's voice (Sherman, 1927b; Kozel and Gitter, 1968), and motion pictures of natural and artificial emotions (Coleman, 1949; Kozel and Gitter, 1968), while others have manipulated the various modes of presentation (Dusenbury and Knower, 1939; Kozel and Gitter, 1968).

Recent reviews of the literature (Davitz, 1964; Ekman, 1965; Bruner and Tagiuri, 1954) indicated that the most popular stimulus employed in recognition of emotion studies has been posed photographs.

Factors Influencing the Perception of Emotion

All emotions are not equally identifiable. Kellogg and Eagleson (1931) reported that the general order of perceptibility is laughter, pain, anger, fear, surprise, and scorn. Davitz (1964) also observed that success in identifying emotions was not uniform, e.g., anger was identified in 65% of the cases, while pride was identified less than 25% of the time. Davitz and Davitz (1959) found that expressors and perceivers were not equally skillful in the identification and expression of different emotions. Woodworth (1938) showed that expression of emotion could be arranged on a scale with six ordered categories: (1) mirth, (2) surprise, (3) fear, suffering, (4) anger, determination, (5) disgust, and (6) contempt. Use of this scale yielded a correlation of .92 between the intended pose and judgment of the perceivers. Gitter and Black (1968a, 1968b) also found the incidence of correct perception of emotion varied significantly with

emotion; happiness and pain gave the highest, and fear and sadness the lowest proportion of correctly perceived emotion.

A number of studies have demonstrated that knowledge of the situation in question has influenced the findings in much of the POE research. Additional knowledge of the stimuli employed may increase the degree of success in identifying the various emotional states (Munn, 1940; Sherman, 1927), or may modify the interpretation of the stimulus (Carmichael, 1937). Hebb (1946) has pointed out that knowledge of the emotion preceding the expression which is to be judged may also influence the respondent.

Perception and Expression of Emotion: Sex Differences

Bruner and Tagiuri (1954) concluded that there was conflicting evidence regarding sex differences in POE. Sherman (1927a) found that there were no sex differences in the ability to judge the emotional expressions of infants. Allport (1924) and Guilford (1929), utilizing the Rudolph series, reported no differences between males and females in their ability to judge emotion. Gates (1923) showed photographs of adult females (published by Ruckmick) to 458 children, ranging in age from 3 to 14. At ages 4, 5, and 9 the girls were slightly superior; at 5, 6, 7, and 8 the boys were superior judges. Coleman (1949), employing movies of laboratory-produced expressions of emotion, reported no sex differences in responses.

There are, however, a number of studies that do report sex differences in POE. Buzby (1924) demonstrated that women were occasionally superior to men in their identification of some faces, whereas Kanner (1931) found that men were slightly superior.

Jenness (1932) suggested that women judge facial expressions somewhat more intuitively than men because of the fact that, in his experiments, women made their judgments in half the time required by the men. However, Guilford (1929) did not find any evidence that women make their judgments in less time than men, nor that either sex makes more "intuitive judgments" than the other. Dusenbury and Knower (1938; 1939) demonstrated that women were better judges of emotion, regardless of the mode of presentation (i.e., motion picture or record). Kellogg (1931) found that Negro girls were consistently superior to Negro boys in POE. However, these findings were not consistent when the subjects were very young.

Vinacke (1949) found that females agreed more than males on the emotion expressed under face alone (just head) and situational conditions (same as face, but includes situational context). In another study, however, Vinacke and Fong (1955) found little or no difference in judgments between sexes for the face-alone condition, but in the situational condition the results were similar to previous findings, that is, females agreed more on the nature of the expression. Kozel and Gitter (1968) found significant differences in sex of perceiver in overall POE; females were superior to males in their overall perception of emotion.

Jenness (1932), in a study which employed only male expressors, stated that the addition of female expressors might have an effect on the distribution of the scores. In an investigation of the possible

personality correlates effecting the ability to enact emotions through facial expressions, Meltzer and Thompson (1964) found that there were no correlates except a general superiority of male over female expressors. In replicating the Meltzer and Thompson study, however, Drag and Shaw (1967) reported a trend which found that females were superior as expressors of emotion. In fact, females were particularly successful in the expression of happiness, love, fear and anger. The authors explain these findings by assuming that these emotions are characteristic of the female role and that the expression of emotion may be a function of practice.

Gitter and Black (1968a, 1968b) found that sex of the expressor significantly interacts with the pattern of correctly perceived emotion, i.e., surprise and fear are more correctly perceived when the expressors are females rather than males.

In summary, although there is conflicting data, it appears that in the perception and expression of emotion, females tend to be slightly superior to their male counterparts.

Perception and Expression of Emotion: Race Differences

Anthropological studies have emphasized national and racial differences in the expression of emotion. Gorer (1935) noted that in Africa:

> . . .Laughter is used by the Negro to express surprise, wonder, embarrassment, and even discomfiture; it is not necessarily or even often a sign of amusement; the significance given to "black laughter" is due to a mistake of supposing that similar symbols have identical meanings.

According to Reusch (1961) the primary function of emotional expression is that of a universal and international emergency language. He claims that anxious trembling or cries of fear are correctly perceived throughout the world; tears are interpreted as a release of tension attributed to moments of grief, pleasure, or pain. Klineberg (1935) stated, however, that in the expression of emotion, and in the interpretation of an emotional expression, there are national and racial differences.

Although these qualitative descriptions point to the possible differences existing between blacks and whites in the perception and expression of emotion, there has been little empirical evidence gathered which illustrates the strength and scope of these differences. There have been studies, however, which attempted to test the effects of national differences in POE. Dickey and Knower (1941) showed American and Mexican high school students pictures of a man and woman in different emotional states. The Mexican children were significantly more accurate in judging 10 out of 11 emotions. Dickey and Knower concluded that these differences in correct POE were the result of a greater sensitivity on the part of the Mexicans to the communicative symbols of action.

In an investigation designed to demonstrate differences that might exist between Oriental and Caucasian college students, Vinacke (1949) had Japanese, Chinese, and Caucasian subjects judge candid camera facial expressions of 20 Caucasians. Vinacke found that

racial groups display the same patterning of interpreting the facial expressions of Caucasians; however, each racial group displayed more agreement than the other two on the different emotional expressions. Vinacke and Fong (1955) found that Orientals agreed more on judgments of Oriental expressions than did Caucasians.

Recently, investigators have been concerned with race differences in expression and perception of emotion. Kozel and Gitter (1968), in a study designed to test the effect of race of expressor on POE, utilized ten female expressors (five white and five black) enacting seven emotions. They found contradicting results for main effect of race of expressor; blacks were more accurately perceived in the expression of the emotions of anger and pain, whereas whites were more accurately perceived when expressing fear and happiness.

In an investigation designed to test the effect of race and sex of perceiver, and race and sex of expressor enacting seven emotions, Gitter and Black (1968) found race of perceiver significantly related to overall POE; Negro perceivers were more accurate in the perception of emotion than their white counterparts. This study of college undergraduates found that the race of perceiver significantly influenced the accuracy of perceiving the seven individual emotions. It also revealed that the race of perceiver significantly influenced the incidence of erroneous perception of the seven emotions; white subjects exhibited a higher rate of erroneously perceived emotions.

Although the literature search yielded only one study utilizing both sex and race of both perceiver and expressor as variables within a single study, it was nevertheless demonstrated that race and sex have been related to perception of emotion. Many of the POE studies were limited because of contradictory results, a lack of experimental rigor, the absence of tests of significance, and the failure to investigate additional operative variables.

POE Among Children

Early investigators reported expressions of emotions among very young infants (Darwin, 1872; Goodenough, 1930; Spietz, 1946). However, many of these findings have questionable validity when one takes into consideration the lack of experimental control and the often present subjectivity in data collection.

Regarding the very young, Sherman (1927a, 1927b) found no consistent patterns of emotions in eight-day old infants. On the other hand, Watson (1919, 1928), who was one of the first to systematically investigate POE among children, concluded that two- and three-year olds were capable of only expressing the grossest emotions.

In an attempt to ascertain the growth of social perception in children, Gates (1923), using a sample of white children, concluded that emotional recognition occurs at the age of three and progressively increases as a child grows older, with some

emotions being more difficult to identify than others. Gates' (1923) findings were replicated by Kellogg and Eagelson (1931) with black children.

METHOD

A balanced 2x2x2 design (see Figure 1) tested the influence of race of expressor (the person portraying the emotion), and race and sex of perceiver (the person making the judgment as to the nature of the emotion) on POE among children.

Figure 1 -- Experimental Design

(1)	R of E	B				W				
(2)	R of P	B		W		B		W		
(3)	S of P	M	F	M	F	M	F	M	F	
(4)	N = 80	10	10	10	10	10	10	10	10	

B = black
W = white

M = male
F = female

R of E = race of expressor
R of P = race of perceiver
S of I = sex of perceiver

Subjects

Eighty (80) children ranging in age from four to six ($\bar{X}$ = 59.9 months) made up the sample of perceivers: 40 white and 40 black -- 20 male and 20 female of each race. They were all enrolled in Headstart Centers in the Metropolitan Boston area.

Stimuli

The study employed six (6) adults as expressors; three (3) white and three (3) black professional actresses. Black and white 35 mm. slides were made of each expressor portraying four

(4) emotions: anger, happiness, surprise and pain. Each slide showed an expressor 3/4 figure, seated and at a 45° angle to the camera. Lighting and background were constant for the twenty-four (24) slides. The slides used in this study were part of the set of stimuli materials utilized in three other POE studies (Gitter & Black, 1968a, 1968b, Kozel & Gitter, 1968).

Procedure

Each child was tested individually by a tester of his own race with a set of twelve (12) slides (3 actresses, either black or white -- 4 emotions each: anger, happiness, surprise and pain). Sequence of slides was randomized for each S. The slides were projected on a 2' x 2' screen located approximately two feet in front of the S.

Before being asked to judge the emotions, each S was shown four cartoon-like drawings, each depicting a situation epitomizing the emotion in question. The tester went over the drawings with the child until he was able to associate the name of each of the four emotions with the appropriate cartoon. The four drawings remained in front of the child throughout the testing session. After presenting each slide the S was asked to point to the cartoon which corresponded with the emotion in the particular slide.

RESULTS

Subjects' responses were coded in two ways:

(1) the emotion perceived corresponded to the emotion portrayed, and

(2) where incorrect, what emotion was in fact perceived.

Coding the data in these two ways produced two types of scores for each S: (1) correctly perceived or accuracy[1] score, i.e., a measure indicating whether an emotion perceived corresponded to the emotion portrayed, and (2) erroneously perceived score, i.e., a measure indicating the frequency of an emotion that was in fact perceived when the perceiver did not correctly judge the emotion portrayed by the expressor.[2]

The analysis involved three dependent variable scores: 1. overall accuracy scores; 2. correctly perceived scores for each emotion, and 3. erroneously perceived scores for each emotion.

Before testing the effects of the IVs, the incidence of Ss' overall accuracy score was compared to chance expectation. The

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[1] Actually there were two correctly perceived or accuracy scores: (1) overall accuracy score, and (2) correctly perceived score for each emotion. While the latter indicated the number of correct responses (out of a possible 3) that the S made for each emotion, the former represented the summing of correct guesses across all of the four emotions.

[2] In the case of erroneously perceived score, there is no overall score, but rather one for each emotion. For example, an erroneously perceived score for happiness represents the number of times that a S identified an emotion as happiness when in fact he was viewing an actor portraying one of the three other emotions.

results of this analysis indicated that the Ss' overall accuracy scores were significantly higher than chance (t=19.78, df=79, $p < .001$).

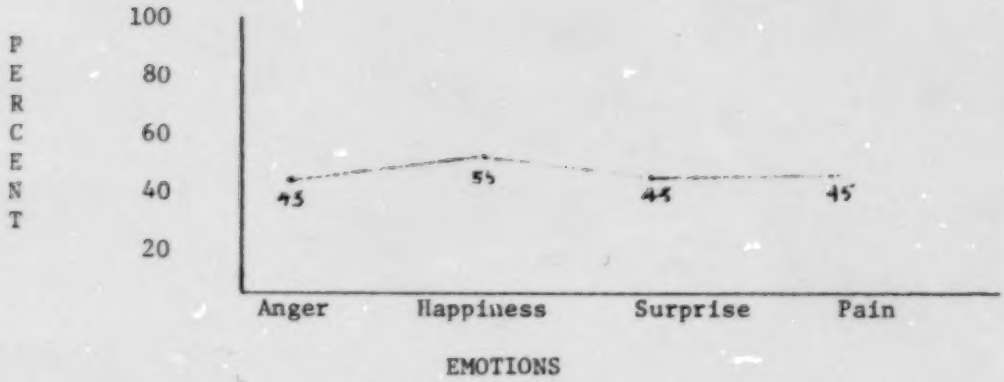
Comparison of White and Black Children

Overall accuracy. A 2x2x2 (S of P x R of P x R of E) ANOVA was performed on the overall accuracy scores data. All of the main effects as well as all of the interactions were nonsignificant (see Appendix, Tables 1a and 1b).

The total sample was also dichotomized in terms of age. The older children were found to be more accurate in judging emotion; the mean overall accuracy score for the younger group ($\bar{X}$ = 38% accuracy) was significantly lower than the one ($\bar{X}$ = 55% accuracy) for their older counterparts (F=14.87, df=1/78, $p < .001$). However, the results of a 2x2x2 ANOVA performed on each of the two subsamples again failed to reveal any significant main or interaction effects for the three independent variables (see Tables 2 and 3).

Correct perception of each emotion. In this analysis Ss' scores for total correct for each emotion were used as repeated measures. ANOVA (2x2x2 with four emotions as repeated measures) results indicated significant differences for emotions. Happiness yielded the highest accuracy scores for POE, followed by pain, anger and surprise (see Figure 2).

Figure 2 -- POE Means: in Percentages*



*Base for computation of percentage = 3 (the Ss saw each emotion expressed 3 times, once by each of 3 actresses).

There were no significant results for either race of expressor nor race or sex of perceiver. This was true for both main effects and first and second order interactions (see Table 4).

Erroneous Perception of each emotion.

This analysis utilized the Ss' erroneously perceived scores for each emotion as repeated measures in a 2x2x2 ANOVA. The results indicated that none of the main effects were significant. One second order interaction and the third order interaction were significant (see Table 5).

DISCUSSION

The present findings indicated that race and sex differences among children perceivers and race differences among adult female expressors do not influence children's POE from posed photographs. This is true both when the effects of these variables were examined acting independently or in interaction with each other. Likewise, these findings emerged regardless of whether the data analyzed concerned overall accuracy of POE, correct perception of each emotion, or erroneous perception of each emotion. The only significant results involved age of the child and the incidence of correct perception varying with the type of emotion.

Research on a number of variables and their relation to POE are in agreement with the present findings, in that they attribute increases in accuracy of POE to the individual's learning from his social environment and becoming more cognizant of subtle cues generated in social interactions. Both Gates (1923) and Kellogg and Eagleson (1931) have reported a positive correlation between age and POE, and Allport (1924) and Guilford (1929) have shown more accurate judgments of emotion to be a function of learning. Additional research points to the relationship between differences in POE and differential socialization and enculturation processes. For example, differences in POE among various ethnic groups who can be presumed to differ in their subcultures have been reported (Black & Gitter, 1968a, 1968b; Kozel & Gitter, 1968; Vinacke, 1949; Vinacke & Fong, 1955; Dickey & Knower, 1941;

Gates, 1923; Guilford, 1929).

As with other investigations of POE (Kellogg and Eagleson, 1931; Woodworth, 1938; Davitz, 1964; Kozel and Gitter, 1968; and Gitter and Black, 1968 a,b) the various emotions are not equally identifiable; happiness and pain are responsible for the highest, while fear and sadness the lowest proportion of correctly perceived emotion. These results are comparable to recent findings of Gitter and Black (1968a,b); both investigations are in agreement with the patterning of correct POE as well as the erroneous judgment of emotion in which fear, pain and sadness are responsible for the smallest proportion of erroneous POE.

The large number of sex and race differences reported in past research would have led one to expect their appearance in this study. The absence of such differences in this study, coupled with the presence of differences in terms of age of the child, strongly suggests that race and sex differences in POE are, in fact, generated by cultural forces. It would also seem that if these influences of socialization in a particular subculture induce differential ability in the perception or expression of emotion, or both, these differences evidently are not crystalized and distinct in early childhood (Bridges, 1932; Honkavaara, 1961).

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APPENDIX

Table 1A -- ANOVA Results -- Overall Accuracy Scores

Source	df	M.S.	F
Sex of perceiver (A)	1	20.000	3.2000
Race of Perceiver (B)	1	.2000	.032
Race of Expressor (C)	1	5.000	.8000
AB	1	14.450	.312
AC	1	.450	.072
BC	1	.050	.008
ABC	1	1.8000	.228
Error	72	6.250	

Table 1B -- POE Overall Accuracy Score Means (in percentage)

ACTRESSES

		W	B		
W	M	44* (5.3)**	60 (6.0)	52	49
	F	44 (5.3)	48 (5.7)	46	
B	M	53 (6.4)	53 (6.4)	53	46
	F	34 (4.1)	42 (5.0)	38	
		43	51		

W = White
B = Black
M = Male
F = Female

* Percentage - base of 12 used
** Actual mean of total correct responses (out of possible 12).

Table 2 -- ANOVA Results for
Younger Group Subsample

Source	df	M.S.	F
Sex of Perceiver (A)	1	0.618	0.159
Race of Perceiver (B)	1	3.363	0.868
Race of Expressor (C)	1	13.451	3.470
AB	1	0.618	0.159
AC	1	0.000	0.000
BC	1	1.098	0.283
ABC	1	2.471	0.637
Error	32	3.876	

Table 3 -- ANOVA Results for
Older Group Subsample

Source	df	M.S.	F
Sex of Perceiver (A)	1	17.612	2.333
Race of Perceiver (B)	1	1.025	0.136
Race of Expressor (C)	1	0.103	0.014
AB	1	18.643	2.469
AC	1	0.027	0.004
BC	1	0.279	0.037
ABC	1	3.591	0.476
Error	32	7.550	

Table 4 -- ANOVA Results for Repeated Measures for Correct Perception of Each of the Four Emotions

Source	df	M.S.	F
Between Ss			
Sex of Perceiver (A)	1	5.000	3.133
Race of Perceiver (B)	1	.050	.031
Race of Expressor (C)	1	1.250	.783
AB	1	3.200	2.005
AC	1	.050	.031
BC	1	.050	.031
ABC	1	.450	.282
Error (Between)	72	1.596	
Within Ss			
Emotions (D)	3	2.758	4.158*
AD	3	.258	.389
BD	3	.242	.364
CD	3	.925	1.394
ABD	3	.375	.565
ACD	3	.075	.113
BCD	3	.375	.565
ABCD	3	.242	4.886*
Error (Within)	216	.663	

* $p < .01$

Table 5 -- ANOVA Results for Repeated Measures for Erroneous Perception of Each of the Four Emotions

Source	df	M.S.	F
Between Ss			
Sex of Perceiver (A)	1	5.253	3.381
Race of Perceiver (B)	1	0.028	0.018
Race of Expressor (C)	1	1.378	0.887
AB	1	3.403	2.190
AC	1	0.153	0.099
BC	1	0.028	0.018
ABC	1	0.378	0.243
Error	72	1.554	
Within Ss			
Emotions (D)	3	1.311	1.088
AD	3	0.178	0.148
BD	3	2.086	1.731
CD	3	0.603	0.500
ABD	3	0.228	0.189
ACD	3	1.978	1.641
BCD	3	10.920	9.057*
ABCD	3	4.877	4.045*
Error	216	1.206	

*$p < .01$